Complete Summary

GUIDELINE TITLE

Best evidence statement (BESt). Long-term outcomes in obstructive sleep apnea.

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Best evidence statement (BESt). Long-term outcomes in obstructive sleep apnea. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2009 Jan 29. 10 p. [20 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Obstructive sleep apnea

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Counseling

CLINICAL SPECIALTY

Family Practice
Otolaryngology
Pediatrics
Psychology

Pulmonary Medicine
Surgery

INTENDED USERS

Advanced Practice Nurses
Health Care Providers
Nurses
Patients
Physician Assistants
Physicians
Psychologists/Non-physician Behavioral Health Clinicians
Respiratory Care Practitioners

GUIDELINE OBJECTIVE(S)

To provide best evidence statements for the assessment of long-term outcomes in obstructive sleep apnea

TARGET POPULATION

Children (ages 0-18 years) with obstructive sleep apnea (OSA)Â who have been treated with adenotonsillectomy (T&A) or continuous positive airway pressure (CPAP)/bilevel positive airway pressure (BiPAP)

INTERVENTIONS AND PRACTICES CONSIDERED

1. Discussion of long-term treatment outcomes with families of children with obstructive sleep apnea
2. Measurement of quality of life, neurocognitive behavior, and clinical parameters
3. Recurrence of sleep disordered breathing

MAJOR OUTCOMES CONSIDERED

- Changes in quality of life
- Changes in neurocognitive behavioral abnormalities
- Changes in clinical and laboratory parameters associated with sleep disordered breathing
- Rate of change in the above categories
- Relapse rate

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Search Strategy

Original Search

- OVID DATABASES
  - MedLine, CINAHL, Psych Info, Cochrane Database for Systematic Reviews (CDSR)
- OVID FILTERS
  - Publication Date: 1996 to present
  - Limits: Humans and English Language
  - Study Type: Highest Quality Evidence
- SEARCH TERMS & MeSH TERMS (MedLine & CINAHL)
  - Patients/Population:
    - exp Sleep Apnea, Obstructive/ or (OSA or obstructive sleep apnea).mp.
      limit to ("all child (0 to 18 years)" or all child <0 to 18Â years>)
      (pediatr$ or child$).mp.
  - Intervention/Exposure:
    - exp adenoidectomy/ or exp tonsillectomy/ or (adenotonsillectomy).mp. or exp Continuous Positive Airway Pressure/ or (CPAP or BiPAP or continuous positive airway pressure or positive airway pressure or non-invasive airway pressure).mp.
      (nasal interface or mask or humidif$ or autotitration or c-flex).mp.
  - Comparison outcomes:
    - not applicable
  - Outcomes:
    - long term outcomes (sleeping better, daytime functioning [measured by various instruments, including PedsQL, Michigan, Conner's etc.], academic performance)

Additional Articles

- Identified from reference lists, systematic reviews, and clinicians

NUMBER OF SOURCE DOCUMENTS

18

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus
Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Quality Level	Definition
1a* or 1b*	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5	Other: General review, expert opinion, case report, consensus report, or guideline

*a = good quality study; b = lesser quality study.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In determining the strength of a recommendation, the development group makes a considered judgment in a consensus process that incorporates critically appraised evidence, clinical experience, and other dimensions as listed below.

1. Grade of the Body of Evidence (see the "Rating Scheme for the Strength of the Evidence" field)
2. Safety/Harm
3. Health benefit to patient (direct benefit)
4. Burden to patient of adherence to recommendation (cost, hassle, discomfort, pain, motivation, ability to adhere, time)
5. Cost-effectiveness to healthcare system (balance of cost/savings of resources, staff time, and supplies based on published studies or onsite analysis)
6. Directness (the extent to which the body of evidence directly answers the clinical question [population/problem, intervention, comparison, outcome])
7. Impact on morbidity/mortality or quality of life

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation

Strength	Definition
"Strongly recommended"	There is consensus that benefits clearly outweigh risks and burdens (or visa-versa for negative recommendations).
"Recommended"	There is consensus that benefits are closely balanced with risks and burdens.
No recommendation made	There is lack of consensus to direct development of a recommendation.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Reviewed by the Clinical Effectiveness group.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the strength of the recommendation ("strongly recommended", "recommended", and no recommendation made) and levels of evidence (1a-5) are provided at the end of the "Major Recommendations" field.

It is strongly recommended, for families of children with obstructive sleep apnea (OSA), that long-term outcomes of treatment with surgery or continuous positive airway pressure be discussed.

Quality of Life

For children 1 to17 years of age with obstructive sleep apnea, significantly statistical improvement in the following parameters has been measured at least 6 months, and as long as 5 years, after adenotonsillectomy (T&A) or with continuous positive airway pressure (CPAP) treatment:

- Sleep disturbance
- Physical suffering
- Sleep breathing and loudness of snoring

- Emotional distress
- Excessive daytime sleepiness
- Speech and swallowing difficulties
- Daytime problems
- Caregiver concerns

See Appendix 1 in the original guideline document (Constantin et al., 2007 [4a]; Diez-Montiel, 2006 [4a]; Mitchell et al., 2004 [4a]; Flanary, 2003 [4a]; Marcus et al., 2006 [4b]).

Note: These improvements were found regardless of instrument or inventory used to measure quality of life (Constantin et al., 2007 [4a]; Diez-Montiel, 2006 [4a]; Mitchell et al., 2004 [4a]; Flanary, 2003 [4a]; Marcus et al., 2006 [4b]).

Neurocognitive Behavior

For children 2 to 18 years of age with sleep disordered breathing (SDB) and/or obstructive sleep apnea, significantly statistical improvement in the following behavioral abnormalities has been measured at least 6 months, and as long as 18 months, after T&A:

- Attention deficit
- Daytime sleepiness
- Aggression
- Somatization
- Atypicality
- Behavioral symptoms index (BSI)
- Depression
- Externalizing and internalizing problems
- Hyperactivity
- Somnolence
- Academic difficulties

See Appendix 2 in the original guideline document (Ebert & Drake, 2004 [1b]; Chervin et al., 2006 [3a]; Mitchell & Kelly, 2006 [4a]; Friedman et al., 2003 [4b]).

> **Note 1**: The significance of the improvement may not be seen until 6 to12 months after surgery but improvement will be maintained at least 18 months (Mitchell & Kelly, 2006 [4a]).
>
> **Note 2**: No studies evaluated long-term neurocognitive behavior outcomes in children after treatment with continuous positive airway pressure or bilevel positive airway pressure (BiPAP).
>
> **Note 3**: First-grade children who demonstrated academic difficulties and presented with Sleep Associated Gas Exchange Abnormalities (SAGEA) had an T&A performed, showed significant improvement in their academic performance during the second grade (Gozal, 1998 [2a]).

Clinical Parameters

For children 2 to 16 years of age, with continuous positive airway pressure treatment for obstructive sleep apnea or treatment with T&A for any reason, significantly statistical improvement in the following clinical parameters has been measured for at least 6 months, and for as long as 12 months:

- Apnea/hypopnea index (AHI)
- Weight for height (increase was improvement)
- Respiratory parameters
- Serum insulin-like growth factor-I (IGF-I)
- E/A ratio*, left ventricle (LV) diastolic function
- Body mass index (BMI) (increase was improvement)
- Serum insulin-like growth factor-binding protein 3 (IGFBP-3)
- Mean sleep latency
- Arterial oxygen saturation (Sa_{O2}) nadir

*E/A = a measure of left ventricle diastolic function and is the ratio of the velocity of the early wave occurring during early diastolic filling and the velocity of the second wave occurring during atrial contraction

See Appendix 3 in the original guideline document (Gozal, Capdevila, & Kheirandish-Gozal, 2008 [2b]; Chervin et al., 2006 [3a]; Amin et al., 2005 [3b]; Selimoglu, Selimoglu, & Orbak, 2003 [3b]; Nieminen et al., 2002 [3b]; Marcus et al., 2006 [4b]; Stradling et al., 1990 [4b]).

Recurrence of SDB 12 months post-surgery with increased risk for elevated blood pressure occurs among a significant subset of children regardless of resolution of SDB at 6-weeks post-surgery (Amin et al., 2008 [3a]).

Note: A prospective study of 40 children with SDB treated with T&A, compared with 30 healthy controls, demonstrated that:

- 50% of children experienced recurrence of SDB at 12 months regardless of 6-week post-surgery resolution rates.
- Obesity, velocity of body mass index increase, and being African American are independent contributors to recurrent SDB at 12 months post-surgery as demonstrated by multivariable logistic regression.
- Increased blood pressure compared to pre-surgery levels is associated with recurrent SDB 12 months post-surgery (P = 0.03) (Amin et al., 2008 [3a]).

Definitions:

Strength of the Recommendation

Strength	Definition
"Strongly recommended"	There is consensus that benefits clearly outweigh risks and burdens (or visa-versa for negative recommendations).
"Recommended"	There is consensus that benefits are closely balanced with risks and burdens.
No recommendation	There is lack of consensus to direct development of a

Strength	Definition
made	recommendation.

Levels of Evidence

Quality Level	Definition
1a* or 1b*	Systematic review, meta-analysis, or meta-synthesis of multiple studies
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5	Other: General review, expert opinion, case report, consensus report, or guideline

*a = good quality study; b = lesser quality study.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate post-treatment expectations and follow up for children treated for obstructive sleep apnea

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2009 Jan 29

GUIDELINE DEVELOPER(S)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

SOURCE(S) OF FUNDING

Cincinnati Children's Hospital Medical Center

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Group/Team Members: Raouf Amin, MD, Pulmonary Medicine; Dean Beebe, PhD, ABPP-Cn, Behavioral Medicine and Clinical Psychology, Neuropsychology; Barbara Chini, MD, Pulmonary Medicine; Julia Malkin, RN, MSN, CNP, Pulmonary Medicine; Maninder Kalra, MD, MS, Pulmonary Medicine; Hemant Sawnani, MD, Pulmonary Medicine; Narong Simakajornboon, MD, Pulmonary Medicine

Clinical Effectiveness Support: Amrita Chima, MBA, Quality Improvement; Eloise Clark, MPH, MBA, Evidence Facilitator; Barbarie Hill, MLS, Pratt Library; Danette Stanko-Lopp, MA, MPH, Epidemiologist; Karen Vonderhaar, MS, RN, Methodologist

Ad Hoc Advisor: Paul Willging, MD, Otolaryngology

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@chmcc.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Judging the strength of a recommendation. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Jan. 1 p.

- Grading a body of evidence to answer a clinical question. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 1 p.
- Table of evidence levels. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Feb 29. 1 p.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@chmcc.org.

PATIENT RESOURCES

None available

NGC STATUS

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